Stratospheric Observatory for Infrared Astronomy (SOFIA)
NASA 747-200 Simulator Bay Leasing, Operations, and Maintenance Services

Statement of Work

December 2015

Introduction & Background

The Stratospheric Observatory For Infrared Astronomy (SOFIA) is an international science program with joint participation by NASA (National Aeronautics and Space Administration) and the German DLR (German Aerospace Center). To conduct its scientific mission, SOFIA operates a modified Boeing 747SP aircraft (N747NA), which flies an on-board infrared telescope assembly, collecting astronometric science data during nighttime hours, while flying at altitudes of 35,000-45,000 feet.

To maintain the proficiency and currency of the SOFIA aircraft flight crews, both NASA pilots and flight engineers receive training using a NASA-owned 747-200 Level C-type training simulator (FAA ID #29). NASA also uses the simulator training for initial qualification, to include the issue of type ratings of new flight crew members, using Flight Training International (Denver, CO) part 142 certificate.

The NASA simulator was previously housed and operated at the United Flight Training Center (DENTK) in Denver, CO, under contract to NASA (NND11AQ62P). This previous contract will be completed on or around March 1, 2016, and NASA plans to relocate and operate the simulator at a new location under a new multi-year contract.

Objective and Scope

The objective of the NASA SOFIA 747-200 Simulator Bay Leasing, Operations, and Maintenance Services effort is to: (1) provide maintenance, storage and utilities for the NASA 747-200 simulator, (2) conduct aircrew training for proficiency checks, landing currency, and initial qualification, and (3) maintain Level C FAA certification.

Description of Requirements

A summary of the technical requirements for the Leasing, Operations, and Maintenance Services effort are as follows:

- The contractor shall house the simulator in a suitable simulator bay for a period of five years from the award of the contract. The simulator bay shall have any required floor space, load-bearing floor, hydraulics, power, heating and air conditioning, fire protection, etc. The contractor shall also provide facilities and space for crew briefing/debriefing, classroom instruction, equipment storage, control room operations, etc.

- The simulator shall be nominally available for crew training from 8:00 am to 10:00 pm local time, Monday through Friday, excluding Thanksgiving Day, Christmas Day, and New Year's Day. The simulator shall be available for occasional weekend use, not to exceed once a month. The Contractor will be nominally given a 24-hour advance notice for training activities.
- The contractor shall operate and maintain the simulator, support flight crew training, conduct routine and preventive maintenance, etc. The simulator shall be pre-flighted on a daily basis.
- Maintenance.
    - The contractor shall develop and follow a Scheduled (or Routine or Preventative) maintenance plan. Scheduled maintenance should include any required "consumables" (fluids, bulbs, cables & wires, etc.).
    - Additional maintenance and project work, including unscheduled maintenance and rotable instrument repair, performed by the contractor on the NASA simulator, will be contracted on a per-event basis, subject to approval by NASA.
    - The contractor shall use NASA-provided GFE spares for LRU repair and replacement. Replacement of spares stock, and purchase of new equipment, is subject to approval by NASA.
    - The contractor shall keep simulator maintenance records under an FAA-compliant maintenance record management system.
    - The Government shall have access to all maintenance logs, records, etc., and will periodically request copies and/or access to the maintenance logs.
- The contractor shall maintain the NASA simulator at its current Level C FAA certification, as per the current regulations of the National Simulator Program, document device discrepancy clearances, and will support the renewal of the FAA Certification on an annual basis.
- The contractor shall establish and follow a quality management system (QMS) approved by the National Simulator Program Manager (NSPM).
- The contractor shall provide access to and scheduling of simulator for flight crew members approved by NASA, including external users and trainers.
- The contractor shall manage and control NASA-provided GFE (Government Furnished Equipment); see below. In addition, the contractor shall assess equipment requirements (e.g., end of life) and advise NASA of purchase/replacement requirements.
- The contractor shall provide adequate safety and security for NASA personnel and materiel.
- The contractor shall support completion of the simulator baseline-to-baseline move (previous location to new location), provided by independent simulator move contractor.

<u>Additional Quality Requirements</u>

- Any modifications or improvements to the simulator shall be processed through and approved by the SOFIA Observatory Configuration Control Board (OCCB) and contractor shall maintain records of those actions
- All procured parts for the simulator shall meet NASA Q1(A) quality requirements
- Contractor subject to annual audit by NASA QA representatives

Government Furnished Equipment

NASA will provide to the contractor as Government Furnished Equipment and other Technical Data:

1. Full Flight Simulator (FFS) cab and visual system, including support/actuation structure, hosing, tubing, connectors, and hydraulic components, rams, valves and associated spare parts.

2. Controller ops cabinets (12), including host computer and image generator.

3. Equipment spares, including five image projectors, air handler, and board testers.

4. All available technical documentation, including operations manuals and drawings. (Paper form.)

5. Maintenance records for the prior 2-3 years. (Electronic form.)

6. Any available FAA certification or qualification paperwork (including QTGs, SOQ, etc.).

7. Prior Preventative Maintenance Schedule. (Electronic form.)

8. Visualization database (including inflight refueling simulation).

NASA will provide an initial (reference) equipment inventory to contractor at the beginning of the contract. NASA retains ownership to all GFE and Technical Data and can remove, relocate, or dispose at its sole discretion.

Deliverables

The contractor shall provide contract deliverables, including:

- Quarterly Status Report, including number of flight hours used, maintenance activities performed, etc. (see below).
- Notification of renewal of FAA NSP Statement of Qualifications for Level C simulator (annual basis).
- Final Equipment Inventory (at close of contract).

Reporting

The contractor shall provide a written quarterly status report describing the work accomplished (versus planned), a cost summary (versus planned), and identification of any issues, concerns, risks, etc. In addition, the contractor shall conduct periodic status tag-ups and host on-site visits with NASA.

Schedule

All milestone dates are defined as days After Receipt of Order (ARO). Order receipt is the effective date of the funded Contract. Contractor shall provide a milestone schedule reflecting the approximate AROs below with calendar dates for review by the Contracting Officer Representative (COR). The agreed to calendar dates will be managed by the contractor and monitored by the COR for receipt and acceptance.

Milestone	Date
Contract Award	0 days ARO
Proposed Calendar Milestone Schedule	15 days ARO
Facilities Preparation & Modifications Complete	75 days ARO
Simulator Installation Complete	90 days ARO
First Quarterly Status Report Due	90 days ARO
Flight Crew Check-out	90 – 95 days ARO
NASA Readiness Review	95 days ARO
Begin Normal Sim Operations	85 days ARO
FAA Recertification Complete	180 days ARO

Vendor Qualifications and Standards of Practice

1. The vendor must have experience with housing, operating, and maintaining hydraulic-type full motion simulators. Specifically, the staff should be versed in legacy simulator technology, and also capable of technology upgrades, as the current equipment and software become unsupportable.

2. All proposed and performed work must meet FAA and NASA standards for quality, maintenance, training, record keeping, etc.

Other Information, Terms, and Conditions

1. NASA 747-200 Simulator Information:

FAA NSP ID #: 29 (747-200)
SOQ Validation: 11/5/15
Sim Type: Full Flight Simulator (FFS), Level C
Weight: 16 tons
Nominal Dimensions: 15' x 19', height 13'
Host Computer: Motorola 88K
Visual Image Generator: Rockwell EP1000
Engine Type: PW JT9D/7J

2. Total annual simulator training hours can typically range from 150-450 hours (600 hours maximum).

References

1. 14 CFR Part 60, Appendix E.
2. FAA Advisory Circular AC 43-9C.